

# *Hydration Management*

**Guideline:** Individualized programs to promote adequate hydration should be developed and implemented for people determined to be at risk for overhydration or underhydration.

## **DEFINITIONS:**

**Hydration management:** The promotion of adequate fluid balance that prevents complications resulting from abnormal or undesired fluid levels.<sup>1</sup>

**Individual's record:** A permanent legal document that provides a comprehensive account of information about the individual's health care status.

**Nursing staff:** Registered nurses and licensed practical nurses.

**Primary care prescribers:** Physicians, nurse practitioners, and physician's assistants who provide primary care services and are authorized to prescribe medications and treatments for people on their assigned caseloads.

## **RATIONALE:**

1. People with developmental disabilities may be at significant risk for dehydration.
2. People with developmental disabilities may have frequent difficulty with consumption of adequate amounts of food and liquid due to dysphagia and other neurological or physiological factors.
3. People with developmental disabilities may lack the ability to communicate hunger, thirst, and discomfort in a manner that is meaningful to their caregivers.
4. Preventive health measures, close observation for signs and symptoms of dehydration and over-hydration, appropriate documentation, communication of findings, and appropriate interventions are essential in maintaining the health status of people at risk.

## **EXPECTED OUTCOMES:**

### **Assessment**

Hydration status should be assessed at time of admission, as part of the annual comprehensive physical assessment, and as deemed appropriate when acute situations occur. The assessment will include the following:

1. Basic physiological measures <sup>1</sup>
  - a. Vital Signs (temperature, pulse, respirations, and blood pressure)
  - b. Weight (document scale used and clothing individual wears)
  - c. Height
  - d. Mucous membrane and skin turgor assessment
  - e. Body mass index (BMI) calculated from height and weight using following formula:  
weight in kg. divided by height in meters<sup>1</sup> (kg/m<sup>2</sup>)
  - f. Determination of the level of consciousness
2. Hydration status including <sup>1</sup>
  - a. Urine specific gravity
  - b. Urine color
  - c. Usual pattern of fluid intake
  - d. Intake behaviors (e.g., signs of thirst)
  - e. Special considerations (e.g., NPO status, tube feeding)

3. Medical history
  - a. Diagnosis
  - b. Current medical condition
  - c. History of dehydration or over-hydration
4. Current medications
5. Particular attention should be paid to older adults since the signs of hydration and dehydration may be different than the signs observed in younger people. (See Table 1: Relative Strength of Different Signs of Hydration Status in Elderly.)

### **Risk Identification Phase**<sup>1</sup>

Based on assessment data, a risk appraisal for hydration problems should be completed.

***Risk Factors for Dehydration*** (The more indicators, the greater the likelihood of **dehydration**.)

1. Acute situations:
  - a. vomiting,
  - b. diarrhea
  - c. febrile episodes (deviation from baseline temperature)
  - d. repeated NPO episodes.
2. People with the following diagnoses or conditions
  - a. Alzheimer's or other dementia
  - b. major psychiatric disorders (e.g., depression)
  - c. stroke
  - d. urinary incontinence
  - e. repeated infections
  - f. diabetes
  - g. malnutrition
  - h. cerebral palsy
  - i. dysphagia
  - j. history of dehydration
  - k. reflux
  - l. fluid loss from weeping wounds, burns, excessive sweating
  - m. chronic fluid drainage from gastrostomy or jejunostomy sites, or
  - n. four or more chronic conditions
3. People receiving the following medications
  - a. diuretics
  - b. psychotropics (e.g., anti-psychotics, antidepressants, and anxiolytics)
  - c. laxatives
  - d. steroids
  - e. Angiotensin-converting enzyme (ACE) inhibitors
  - f. medications that affect the state of consciousness, or
  - g. the use of more than 4 medications
4. Chronic cognitive impairment
5. Functional status: semi-dependent (not totally dependent or independent in ADLs)
6. Inadequate nutrition including the use of hyperosmolar or high protein enteral feedings.

***Risk for overhydration*** (The more indicators, the greater the likelihood of **overhydration**.)<sup>2</sup>

1. People with a diagnosis of:
  - a. Congestive Heart Failure

- b. Renal disease
- c. Major psychiatric disorders (schizophrenia and bipolar disorder where polydipsia [excessive thirst] is a prominent feature)
- 2. People taking Lithium
- 3. People receiving excessive intravenous fluid therapy for correction of dehydration.

### **Hydration Management Plan**

Each person considered at risk for overhydration or underhydration should have an individualized goal for daily fluid intake determined by a documented standard for daily fluid intake.

- 1. The daily fluid intake can be calculated as follows:
  - a. 100 mL/kg for first 10 kg weight
  - b. 50 mL/kg for next 10 kg weight
  - c. 15 mL/kg of remaining kg weight <sup>1,3</sup>
- 2. For people receiving a diet consisting of food and fluids:
 

The number calculated for the standard fluid intake represents fluids from all sources (food plus liquids).

  - a. Up to seventy-five percent (75%) of total body fluids are consumed from liquids.<sup>1</sup>
  - b. Therefore, total daily fluid intake needs to be multiplied by 0.75 to determine amount needed from liquids alone.
  - c. Figure 1 provides an example of how to calculate required fluid intake needs from fluids alone when a person is on a diet of foods and fluids.

**Figure 1. Required liquid fluid intake for those on a diet consisting of food and fluids.**

Example: An individual weighs 95 pounds or 43 kilograms (2.2 pounds per kilogram)	
100 mL/first 10 kg weight	100 X 10 = 1,000 mL
50 mL/kg for next 10 kg weight	50 X 10 = 500 mL
15 mL/kg for remaining 23 kg weight	15 X 23 = 345 mL
Total fluid intake need from all sources	1,845 mL
Multiply times 0.75	x .75
<b>Intake needs from liquids alone</b>	<b>1383.75 or 1,385 mL</b>

[See Table 2. Recommended Daily Fluid Intake by Weight]

- 3. For people receiving entire diet from tube feedings alone:
 

As a general rule:

  - a. 1 calorie/mL formulas are approximately 80%-85% water (e.g., 800-850 mL water per 1000 mL formula).
  - b. 1.5 calorie/mL formulas are approximately 75%-80% water (e.g., 750-800 mL water per 1000 mL formula).

**Diets from tube feedings alone, cont'd**

  - c. 2.0 calorie/mL formulas are approximately 70%-75% water (e.g., 700-750 mL water per 1000 mL formula).
  - d. Additional water can come from orally consumed food and liquids, water used to irrigate feeding tubes, and IV solutions.

- e. Figure 2 provides an example of how to estimate additional water needed when the person receives a diet from tube feedings alone.<sup>4</sup>
4. The current fluid intake should be compared with the amount needed.

**Figure 2. Required liquid fluid intake for those on a diet from tube feedings alone.<sup>4</sup>**

Example:

A person weighing 95 pounds (43 kg) is being fed a 1 calorie/mL formula at 75 mL/hr over 24 hours (1800 mL, or 1.8L per day).

1. Estimated daily water needs:

a. 100 mL/first 10 kg weight	$100 \times 10 =$	1,000 mL
b. 50 mL/kg for next 10 kg weight	$50 \times 10 =$	500 mL
c. 15 mL/kg for remaining 23 kg weight	$15 \times 23 =$	<u>345 mL</u>

Total fluid intake need from all sources	1,845 mL
--	----------

2. Water provided by tube feeding formula (1 cal/mL formula)

- a. 800 mL water per 1000 mL formula
- b. The person received 1.8 liters per day
- c.  $800 \text{ mL/L} \times 1.8 \text{ liters} = 1440 \text{ mL}$

Water provided by tube feeding formula	1,440 mL
--	----------

3. Additional water required:

Total fluid needed from all sources	1,845 mL
(minus) Water provided by tube feeding formula	<u>1,440 mL</u>

Additional water required	445 mL/day
---------------------------	------------

5. If there is a risk for dehydration, fluids should be provided according to a planned, consistent schedule throughout the day.
  - a. Fluids should be provided in the appropriate consistency according to the annual nutritional assessment.
  - b. The greatest amount of fluid will probably be given at mealtime.
  - c. A variety of fluids should be offered throughout the day.
  - d. Fluids given with medication administration should be standardized; e.g. 180 mL (6 oz.) per administration time.

6. Fluid intake and output monitoring should be initiated by nursing staff or the primary care prescriber when indicated.
  - a. Fluid intake and urinary output should be recorded on Intake/Output sheet or in the individual's record.
  - b. Color, and specific gravity of urine should be monitored and recorded using the second voiding of the morning. Additional specimens may be tested throughout the day.
  - c. The usual range for specific gravity of urine is 1.015 – 1.025.
  - d. A specific gravity value greater than or equal to 1.020 implies an underhydrated state and requires further monitoring.<sup>1</sup>
  - e. The upper limit of normal for specific gravity is 1.030.
7. Oral intake may need to be adjusted during illness and diagnostic testing.
8. Unexplained weight gain, pedal edema, neck vein distention or shortness of breath may be an indication of overhydration.
  - a. Signs and symptoms of overhydration should be reported to the nurse.
  - b. The individual's condition should be carefully monitored and documented in the individual's record.
  - c. Weight as well as Intake and Output should be evaluated on a daily basis and documented in the individual's record.
  - d. The primary care prescriber should be notified of the change in status.
  - e. At the discretion of the primary care prescriber, fluids may be temporarily restricted.

## GENERAL GUIDELINES

1. Everyone should be encouraged to consume adequate amounts of fluid each day. This includes all liquids (e.g., ice cream, soup, gelatin, juice, and water) taken by mouth and liquids administered through tube feedings and parenterally. (See **Table 2: Recommended Daily Fluid Intake by Weight.**)
2. Extra fluid should be provided in hot weather.
3. Water should be available at all locations where people reside, work, or participate in recreational activities.
4. New admissions should be weighed weekly for the first 4 weeks to establish a baseline. This includes admissions from other institutions, from the community, or from other residential units. Based on history or clinical findings, the nurse, dietitian, or primary care prescriber may determine that a person needs to be weighed more frequently.
5. Baseline weights will be documented in the Vital Sign section of the Major Problems List.
6. Any clinical symptoms of dehydration should be reported immediately by direct care staff to nursing staff.
  - a. Direct care staff should receive training to recognize the signs and symptoms of dehydration.
  - b. If dehydration is suspected, the nurse will screen urine using a chemical reagent strip dipped in urine and report the findings to the primary care prescriber. (**A CLIA waiver is required from DHEC to conduct laboratory tests using chemical reagent strips. See References for DHEC mailing address.**)
  - c. The primary care prescriber should assess the person's over-all health status and determine the medical plan of care.

- d. If weight fluctuates by five percent (5%) or more within any given month, the weight should be rechecked for accuracy and the procedures for monitoring weight initiated. (See Guideline for **Dysphagia and Associated Disorders**)
7. The degree of dehydration is classified as mild, marked, severe, or fatal on the basis of the percentage of body weight loss. (See Table 3: Degrees of Dehydration.)
  - a. If mild dehydration is noted, the following steps may be taken:
    - i. Increase oral fluid intake, if possible. Fluids may be given by a feeding tube, if in place.
    - ii. If there is vomiting, small frequent quantities of clear liquids may be given initially
  - b. If marked or severe dehydration is noted, administration of IV fluids may be necessary and the person should be transferred to an acute care facility.
8. If someone is acutely ill, and is being transferred to an acute care facility, refer to the Guidelines for **Acute Illness and Referral to and Discharge from Acute Care Facilities**.
9. Every effort should be made to determine the etiology of the dehydration. Contributors may include:
  - a. Airfluidized beds<sup>4</sup>
  - b. Medications<sup>1</sup>
    - i. diuretics
    - ii. psychotropic (antipsychotics, antidepressants, and anxiolytics)
    - iii. laxatives
    - iv. steroids
    - v. medications that alter the state of consciousness
    - vi. more than 4 medications
10. People may be referred to the Nutritional Management Committee at the Regional Center for evaluation, diagnosis, and formulation of a treatment plan. (See Guideline for **Dysphagia and Associated Disorders**.)
11. People who have been dehydrated should be monitored on a regular basis by nursing and primary care prescriber to assure fluid and weight are restored and maintained.

### **Outcome Factors of Successful Hydration Management Programs**

1. Hydration levels are maintained at appropriate levels.
2. The number and severity of infections, especially urinary tract infections, decreases.
3. The incidence of constipation decreases.
4. Staff have increased awareness and skill in detecting early signs of dehydration.
5. Early intervention strategies are implemented to prevent serious complications.
6. The necessary parameters are measured and documented to assist in diagnosis and treatment.
7. Monitoring and management of dehydration is done in an effective and expeditious manner.
8. Adequate documentation is found in the individual's record until the situation is resolved.
9. Medical and nursing documentation is clear, concise, and comprehensive.

**Table 1. Relative Strength of Different Signs of Hydration Status in Elderly <sup>1,2</sup>**

Parameter	Physical Sign	Assessment Indices	
		Dehydration <sup>1,2</sup>	Overhydration <sup>2</sup>
Vital Signs	Rapid Pulse	++	
	Orthostatic hypotension	+/-	
Weight	Acute increase		+++
	Acute decrease	+++	
Oral mucous membranes	Dry, pale, decrease saliva	+++	
Tongue	Longitudinal furrows	+++	
	Dry	+++	
Skin Turgor	Decreased	-	
Eyes	Sunken	++	
Axillary sweat	Decreased	+	
Speech	Difficulties	+++	
Confusion	Acute onset	++	
Upper body control	Muscle weakness	++++	
Lower extremities	Pitting edema		++++
Neck veins	Distended in supine position		+++

Note: (+)= some relationship; (++++)= strong relationship; (-)= no relationship

**Table 2. Recommended Daily Fluid Intake by Weight**

Body Weight Kg	Body Weight Pounds	Recommended Total Fluid Intake per day (mL)	Recommended Fluid Intake from <i>Liquids</i> per day (mL)
10	22.0	1000	750
12	26.4	1100	825
14	30.8	1200	900
16	35.2	1300	975
18	39.6	1400	1050
20	44.0	1500	1125
22	48.4	1530	1148
24	52.8	1560	1170
26	57.2	1590	1193
28	61.6	1620	1215
30	66.0	1650	1238
32	70.4	1680	1260
34	74.8	1710	1283
36	79.2	1740	1305
38	83.6	1770	1328
40	88.0	1800	1350
42	92.4	1830	1373
44	96.8	1860	1395
46	101.2	1890	1418
48	105.6	1920	1440
50	110.0	1950	1463
52	114.4	1980	1485
54	118.8	2010	1508
56	123.2	2040	1530
58	127.6	2070	1553
60	132.0	2100	1575
62	136.4	2130	1598
64	140.8	2160	1620
66	145.2	2190	1643
68	149.6	2220	1665
70	154.0	2250	1688
72	158.4	2280	1710
74	162.8	2310	1733
76	167.2	2340	1755

For each additional 2 Kg body weight (approximately 4.5 pounds) add 30 mL total fluid intake of which 22 mL should be from liquids.



**Table 3. Degrees of Dehydration <sup>5</sup>**

Degree of Dehydration	% of weight loss	Symptoms
Mild	2%	Thirst
Marked	5%	Marked Thirst Dry mucous membranes Dryness and wrinkling of skin – poor skin turgor Low-grade temperature elevation Tachycardia Respirations 28 or greater Decrease (10-15 mm Hg) in systolic blood pressure in standing position Slowing of venous filling Urinary output < 25ml/hr (oliguria) Concentrated urine Increased specific gravity (>1.030) Elevated Hct Elevated Hgb Elevated BUN Acid – base equilibrium toward greater acidity Body weight loss
Severe	8%	Symptoms of marked dehydration plus: Flushed skin Systolic blood pressure drop (60 mm Hg or below) Behavioral changes (restlessness, irritability, disorientation, delirium)
Fatal	22–30% of total body water loss can prove fatal	Anuria Coma leading to death

## References

1. Mentes, J.C. & Iowa Veterans Affairs Nursing Research Consortium (2004, February). Hydration Management Evidenced-Based Guideline. The University of Iowa Gerontological Nursing Interventions Research Center, Research Translation and Dissemination Core. Iowa City, IA: University of Iowa.
2. Mentes, J.C. & Iowa Veterans Affairs Nursing Research Consortium (1998, September). Hydration Management Research-Based Protocol. The University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core. Iowa City, IA: University of Iowa.
3. Chidester, J. & Spangler, A. (1997). Fluid intake in the institutionalized elderly. Journal of the American Dietetic Association, 97, 23-28.
4. Campbell, S.M. (1998). Inquire here. Support Line, 20(1), 17.

5. Kee, J.L., & Paulanka, B. J. (2000). Fluids and Electrolytes with Clinical Applications: A Programmed Approach. (6<sup>th</sup> Ed.). Albany, NY: Delmar.

To obtain information about the CLIA waiver please contact:

South Carolina Department of Health and Environmental Control (DHEC)  
Bureau of Certification/CLIA  
2600 Bull Street  
Columbia, SC 29201  
Phone: 803-545-4291